Vickrey Auction for k Items

Bidder	Bid
1	$8
2	$5
3	$2
4	$7
5	$9
6	$4
7	$5
8	$6
9	$2
10	$4

k = 1; Bidder 5 wins and pays $8

k = 3; Bidders 1, 4, and 5 win and each pays $6

Fig. 1

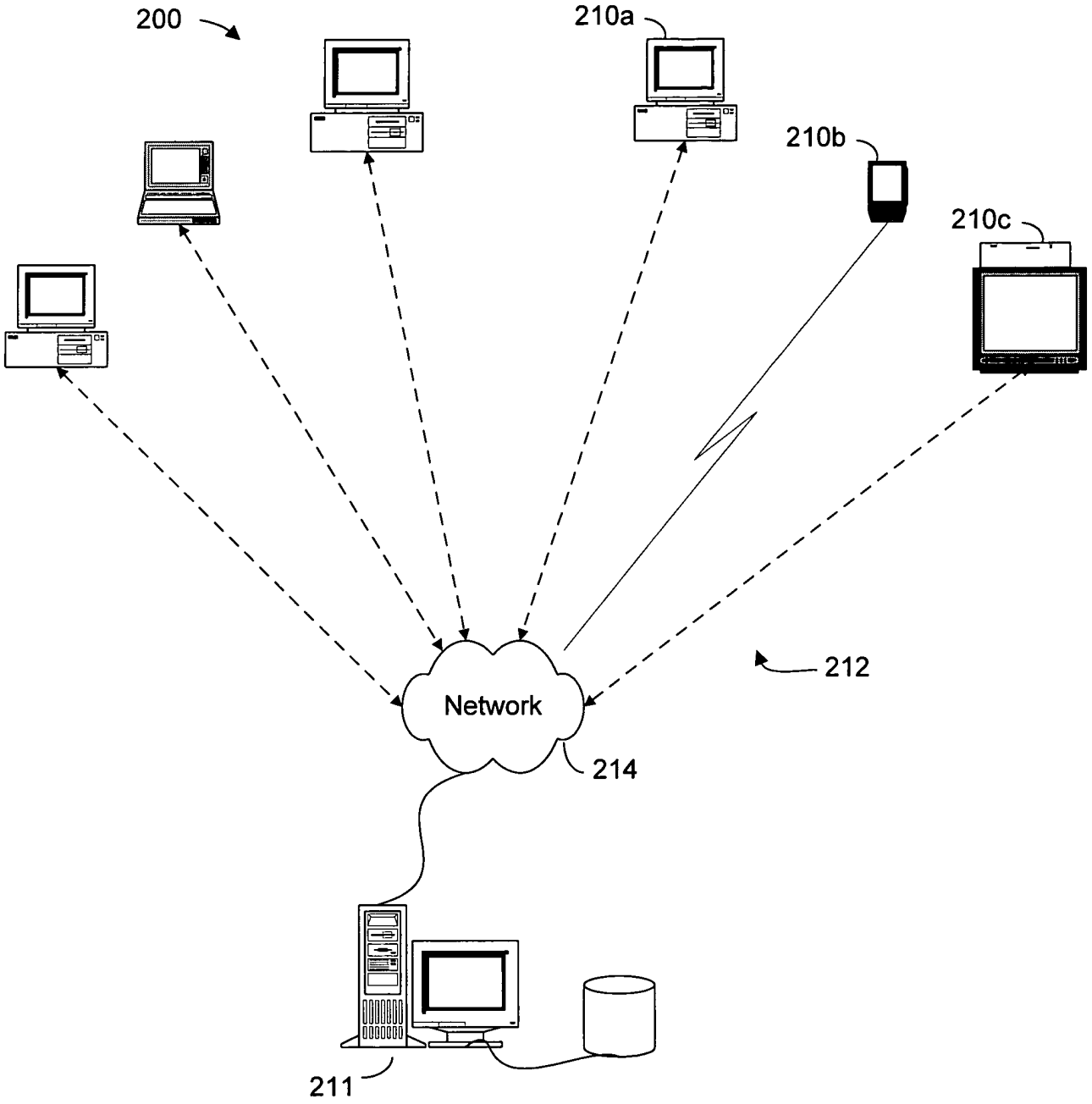

Fig. 2A

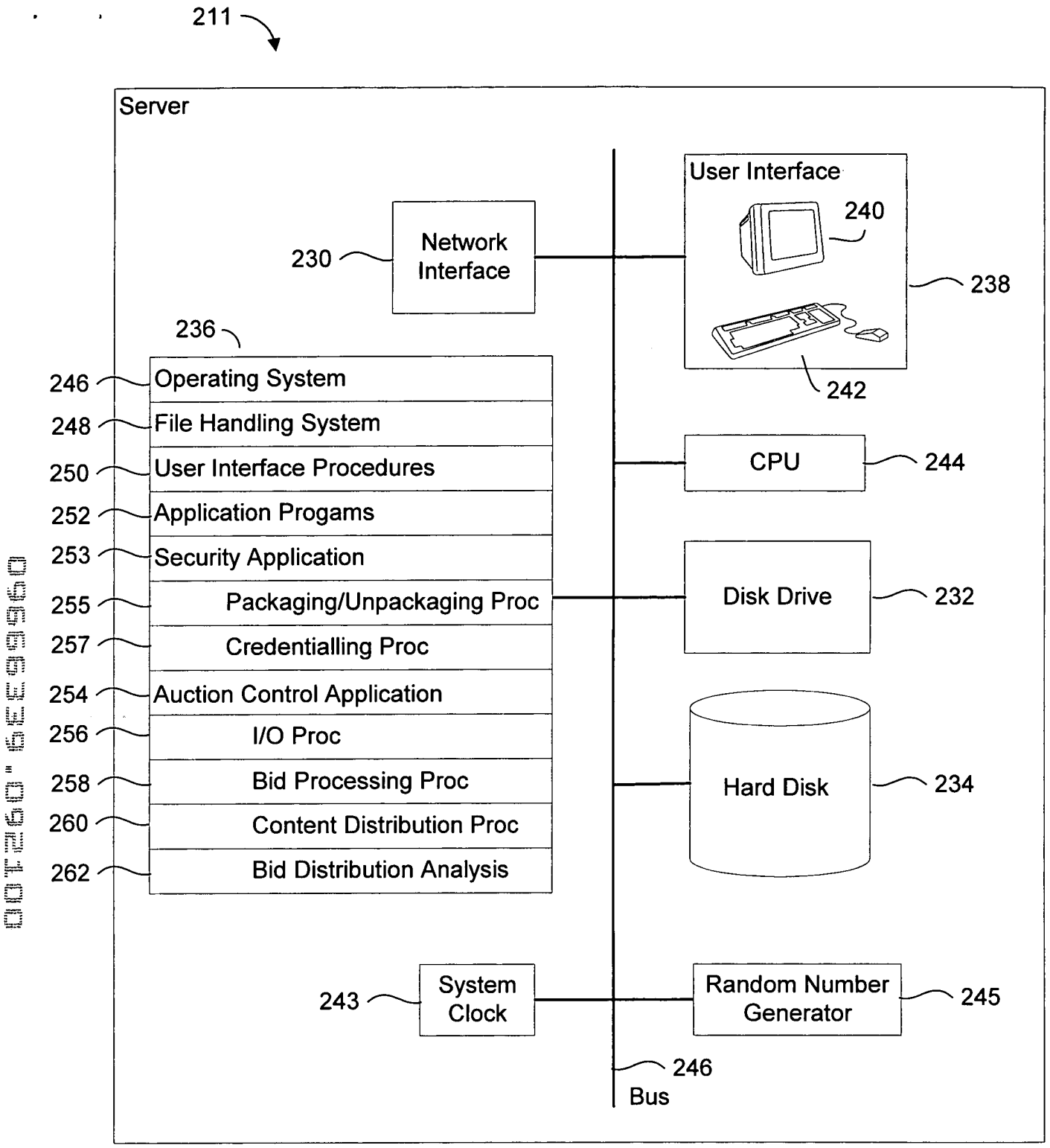
211
Server
User Interface
240
238
242
230
Network Interface
236
246
Operating System
248
File Handling System
250
User Interface Procedures
252
Application Progams
253
Security Application
255
Packaging/Unpackaging Proc
257
Credentialling Proc
254
Auction Control Application
256
I/O Proc
258
Bid Processing Proc
260
Content Distribution Proc
262
Bid Distribution Analysis
CPU
244
Disk Drive
232
Hard Disk
234
243
System Clock
Random Number Generator
245
246
Bus

Fig. 2B

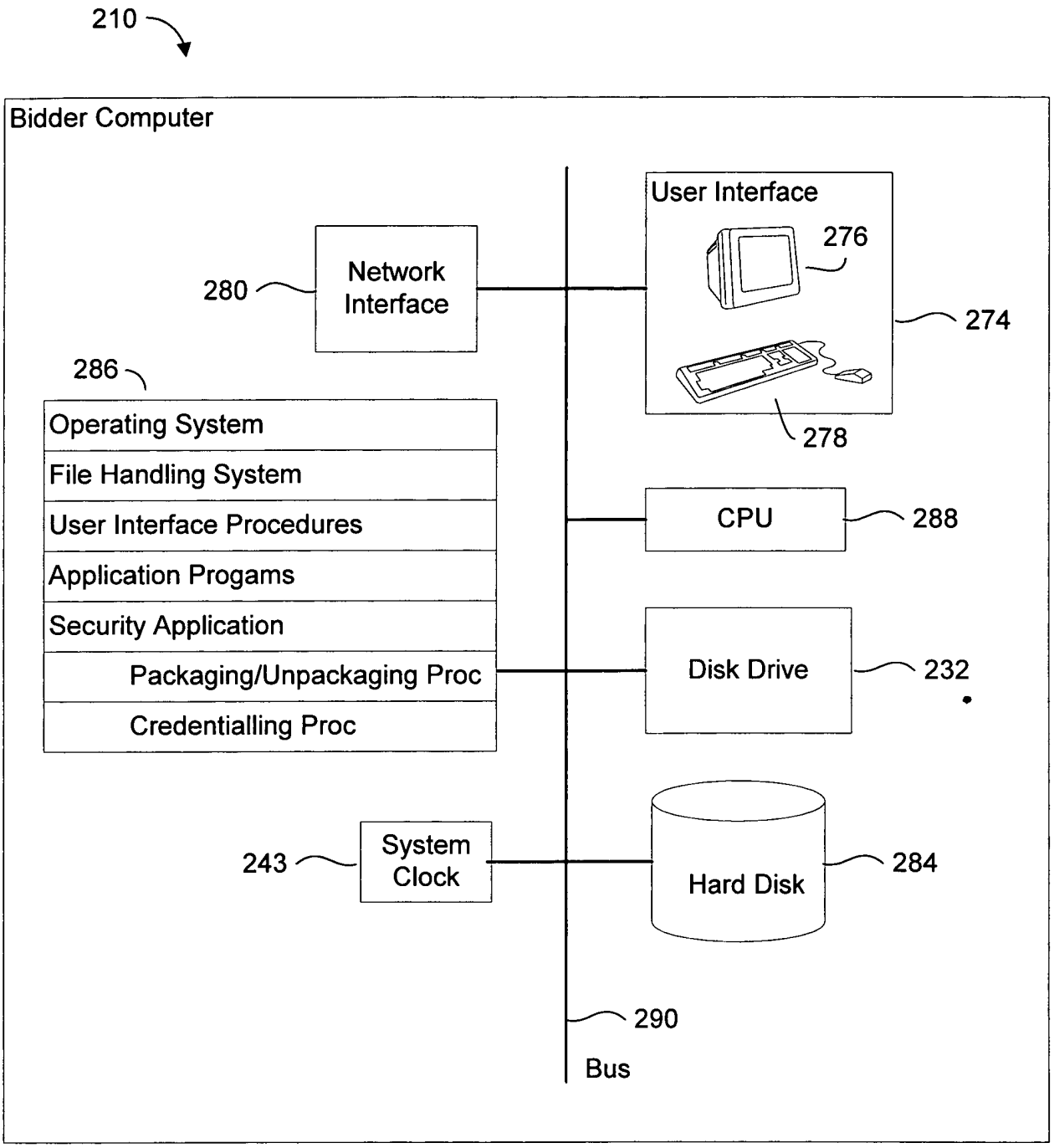
210
Bidder Computer
User Interface
276
274
280
Network Interface
286
278
Operating System
File Handling System
User Interface Procedures
Application Progams
Security Application
Packaging/Unpackaging Proc
Credentialling Proc
CPU
288
Disk Drive
232
243
System Clock
Hard Disk
284
290
Bus

Fig. 2C

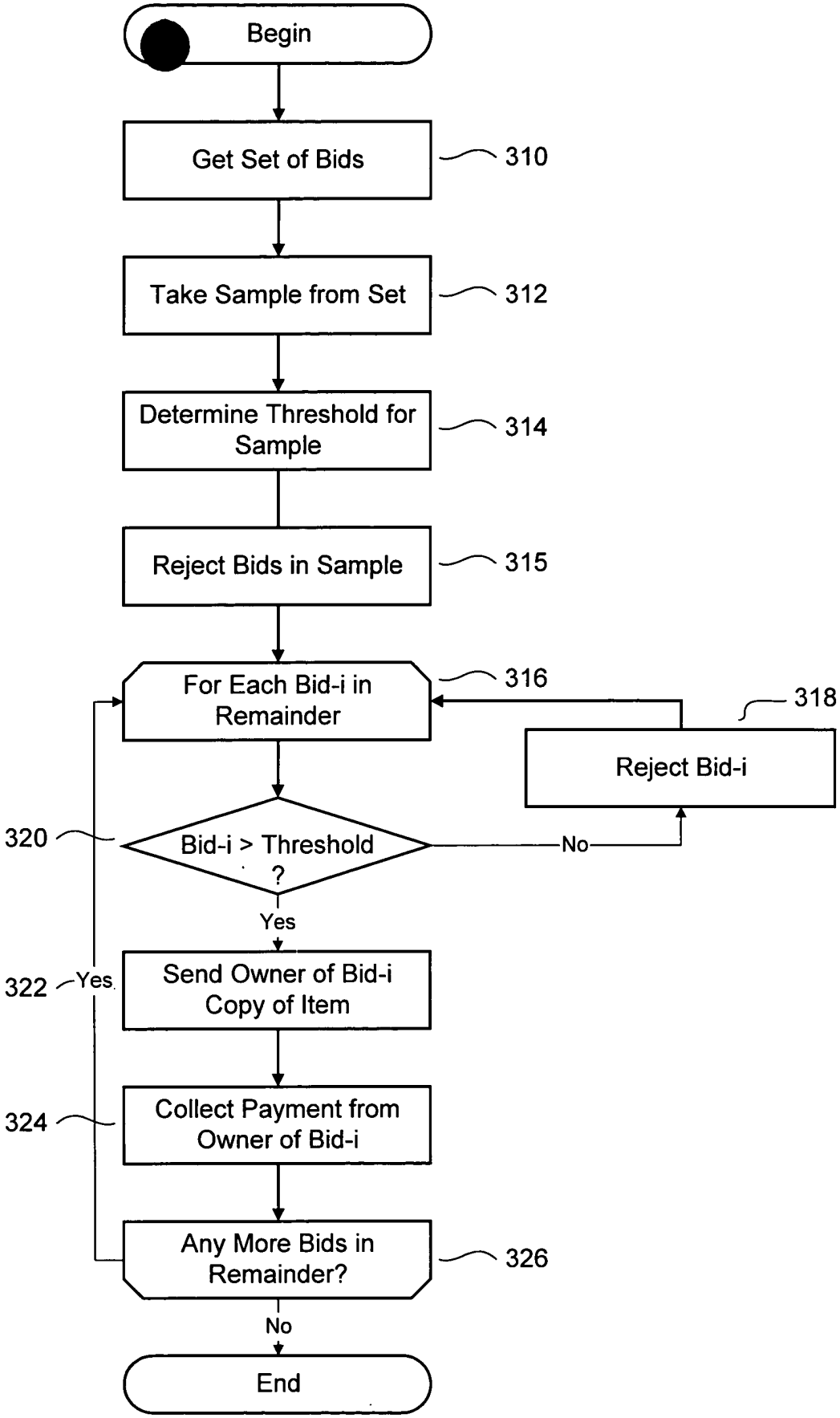
Begin
Get Set of Bids
310
Take Sample from Set
312
Determine Threshold for Sample
314
Reject Bids in Sample
315
For Each Bid-i in Remainder
316
318
Reject Bid-i
320
Bid-i > Threshold ?
No
Yes
322
Yes
Send Owner of Bid-i Copy of Item
324
Collect Payment from Owner of Bid-i
Any More Bids in Remainder?
326
No
End

Fig. 3A

DOCKET NO. 50277-0305

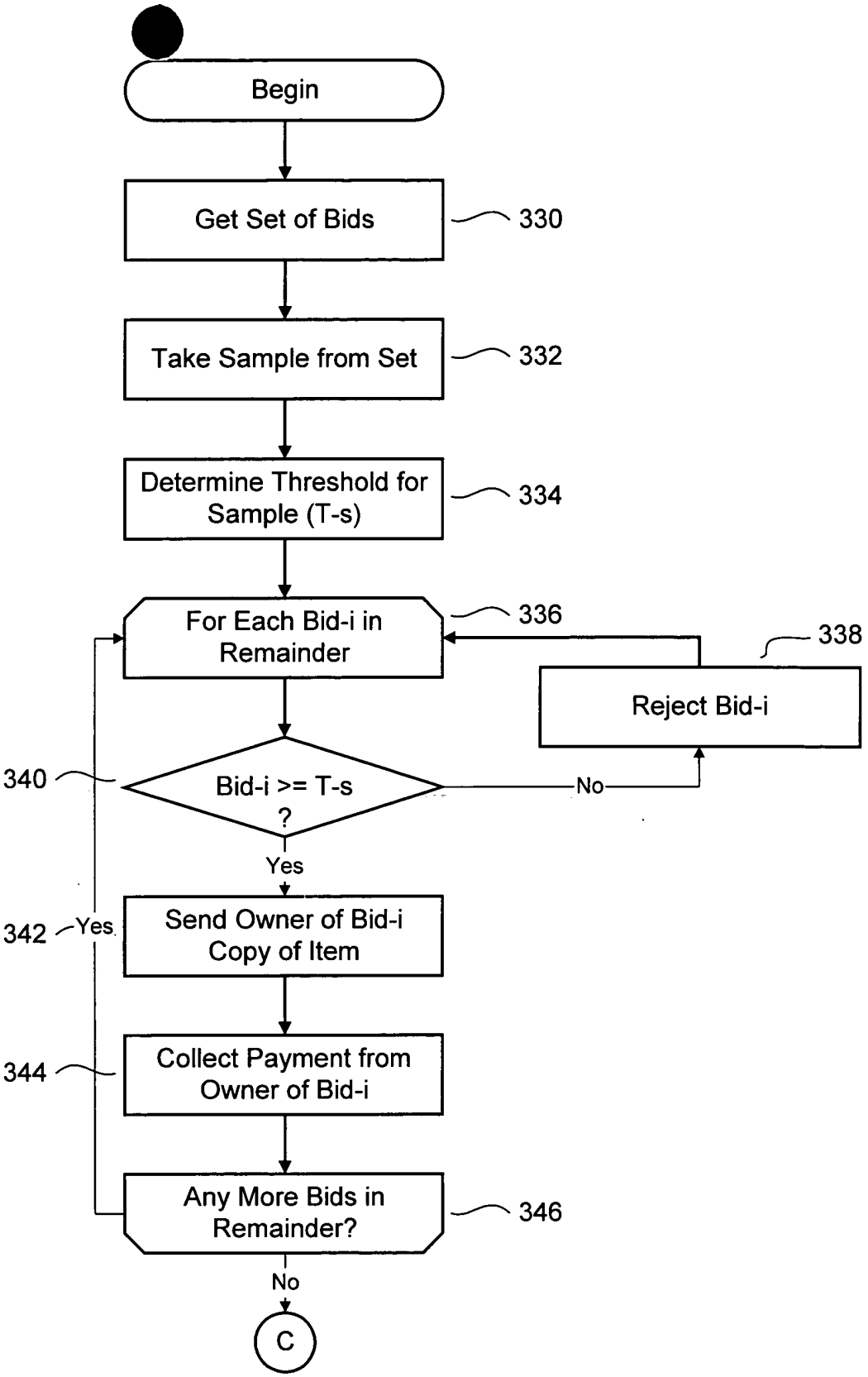

Fig. 3B

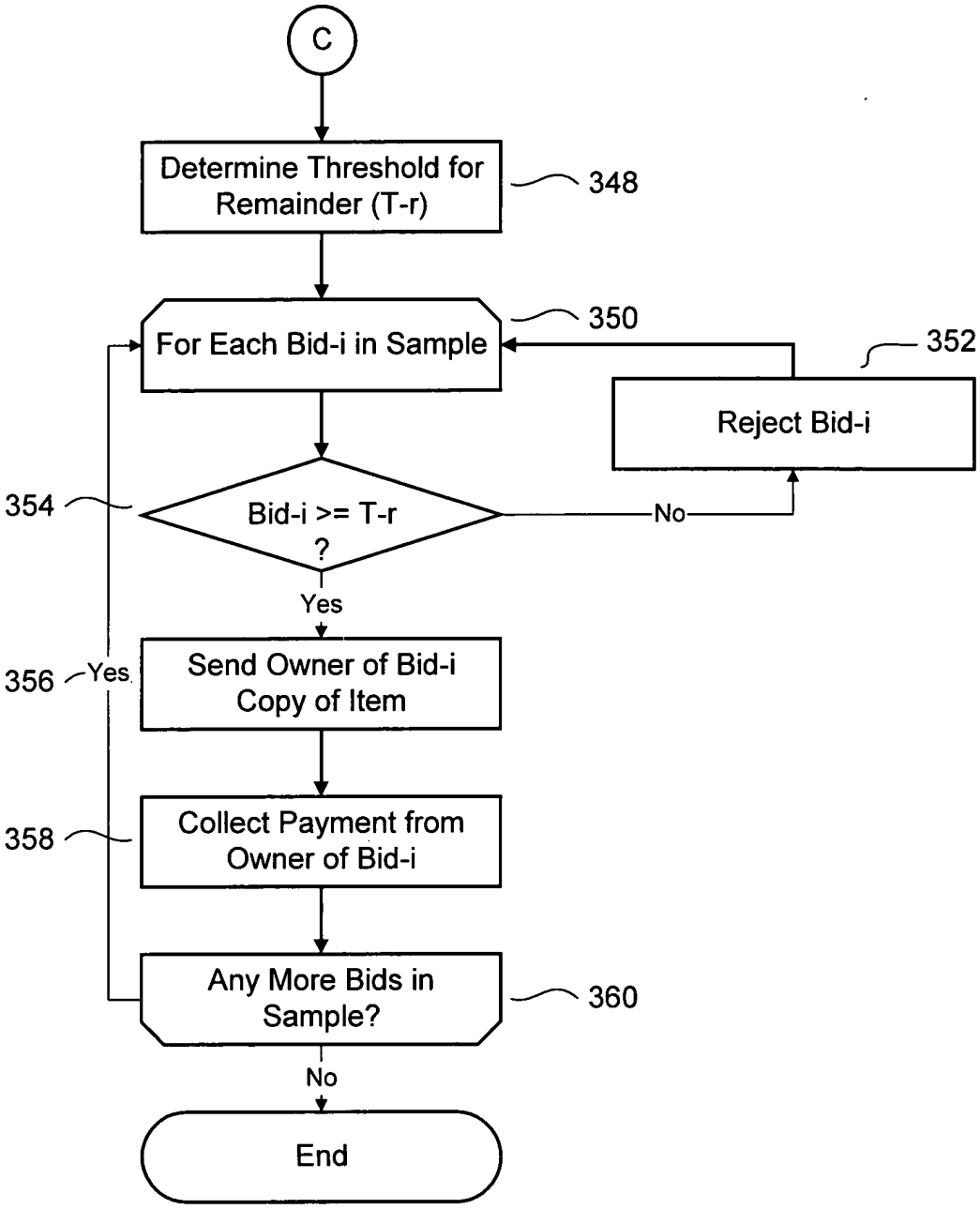
C
Determine Threshold for Remainder (T-r)
348
For Each Bid-i in Sample
350
352
Reject Bid-i
354
Bid-i >= T-r ?
No
Yes
356
Yes
Send Owner of Bid-i Copy of Item
358
Collect Payment from Owner of Bid-i
Any More Bids in Sample?
360
No
End

Fig. 3C

Bidd r	Bid
1	$2
2	$4
3	$3
4	$5
5	$2
6	$6
7	$2
8	$4
9	$2
10	$2
11	$3
12	$5
13	$1
14	$2
15	$4
16	$2
17	$3
18	$1
19	$2
20	$1

Fig. 4A

Threshold	Revenue of Shaded Sample	Revenue of Unshaded Sample
1	$10	$10
2	$16	$18
3	$12	$15
4	$ 8	$16
5	$ 5	$10
6	$ 0	$ 6

Fig. 4B

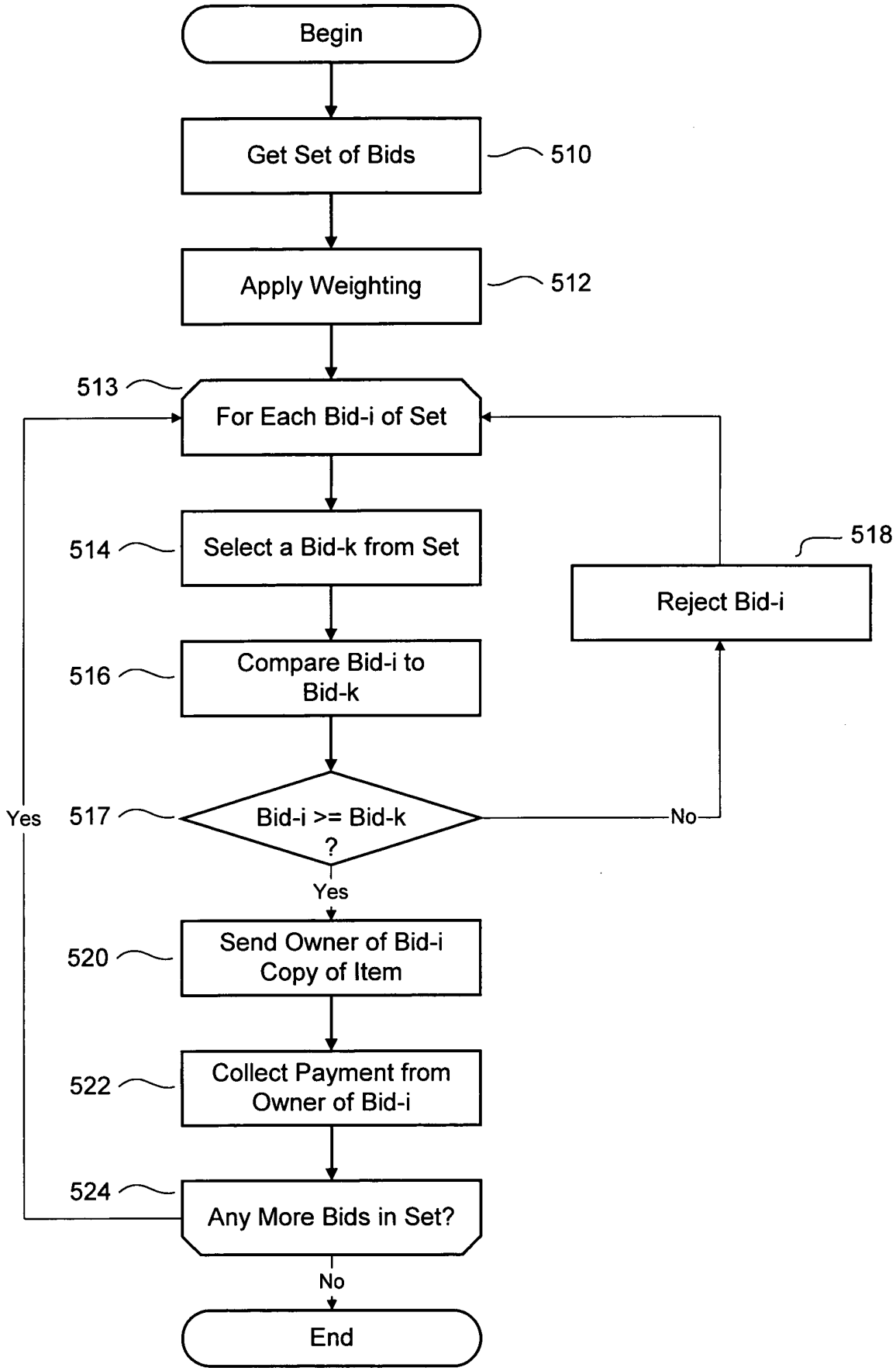
Begin
Get Set of Bids
510
Apply Weighting
512
513
For Each Bid-i of Set
514
Select a Bid-k from Set
516
Compare Bid-i to Bid-k
517
Bid-i >= Bid-k ?
Yes
No
518
Reject Bid-i
Yes
520
Send Owner of Bid-i Copy of Item
522
Collect Payment from Owner of Bid-i
524
Any More Bids in Set?
No
End

Fig. 5

Bidder	Bid	Weight
1	$2	2
2	$4	6
3	$3	9
4	$1	10
5	$2	12
6	$5	17
7	$3	20
8	$4	24
9	$3	27
10	$3	30

Fig. 6A

b_i		Random Number	b_k		Result
Bidder	Bid		Bidder	Bid ($)	
1	$2	20	7	$3	Lose
2	$4	25	9	$3	Win
3	$3	11	5	$2	Win
4	$1	8	3	$3	Lose
5	$2	3	2	$4	Lose
6	$5	24	8	$4	Win
7	$3	13	6	$5	Lose
8	$4	1	1	$2	Win
9	$3	30	10	$3	Win
10	$3	23	8	$4	Lose

Fig. 6B

DOT260 6EE9960

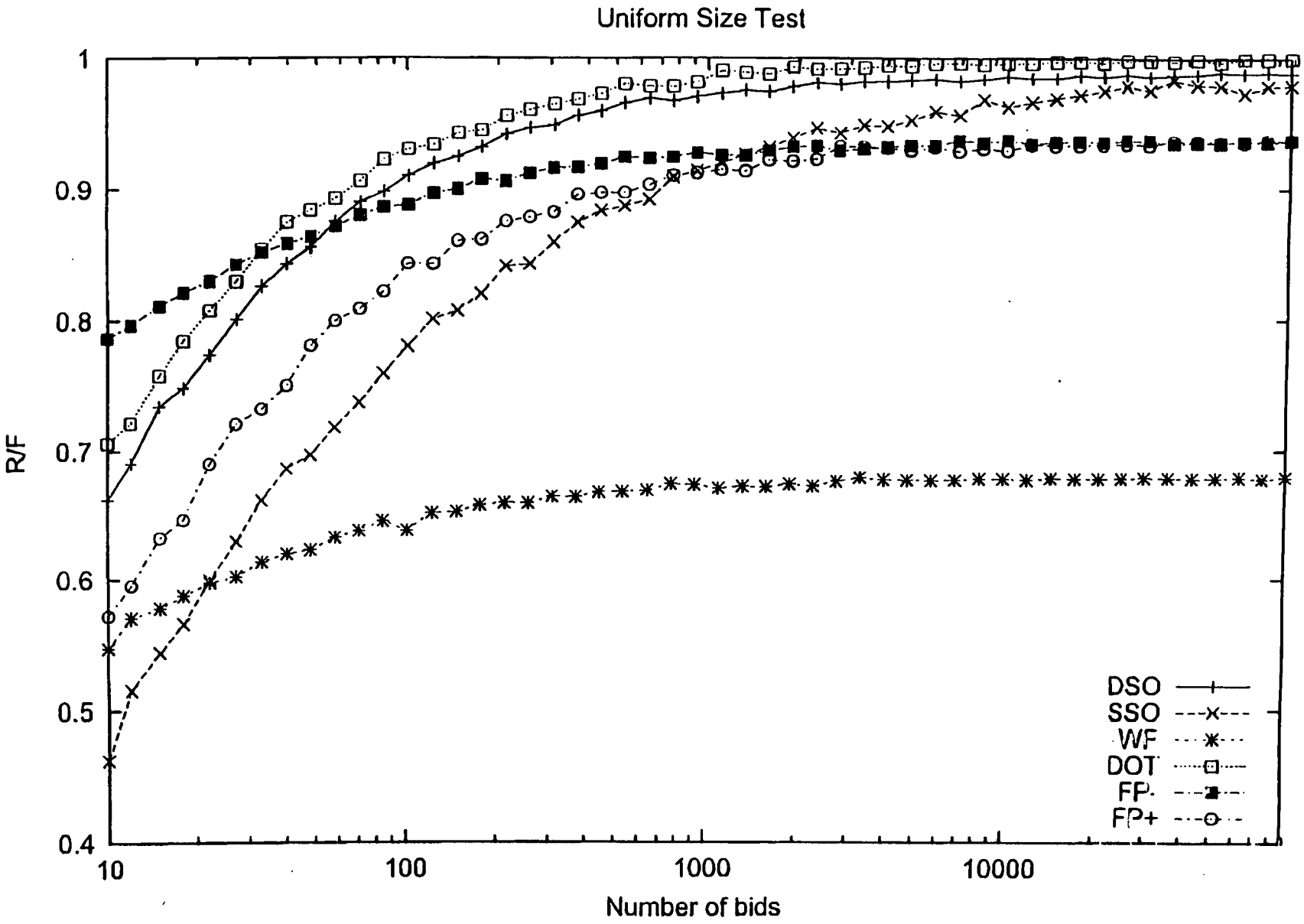

FIG. 7

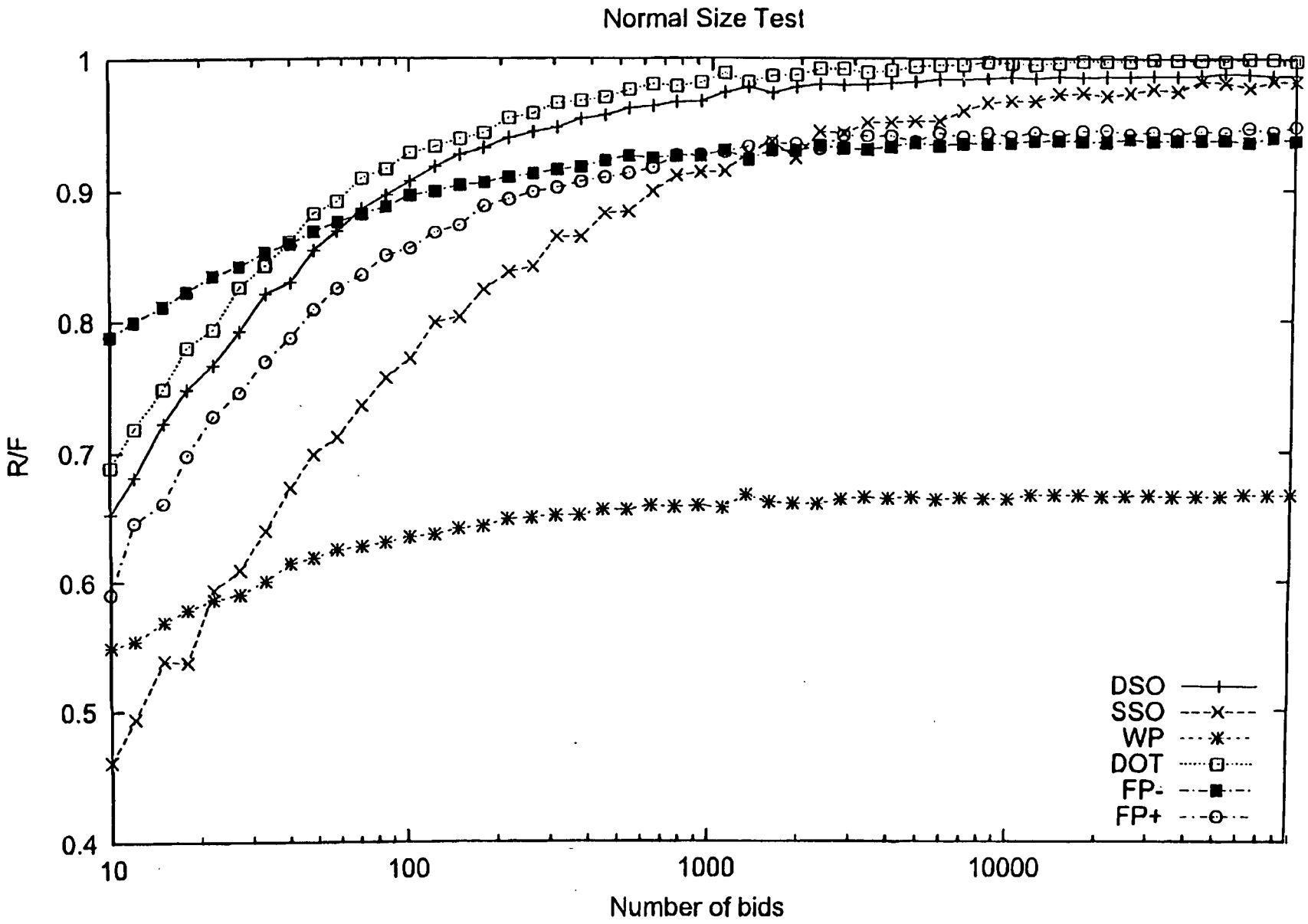
Normal Size Test
R/F
1
0.9
0.8
0.7
0.6
0.5
0.4
10
100
1000
10000
Number of bids
DSO
SSO
WP
DOT
FP-
FP+

FIG. 8

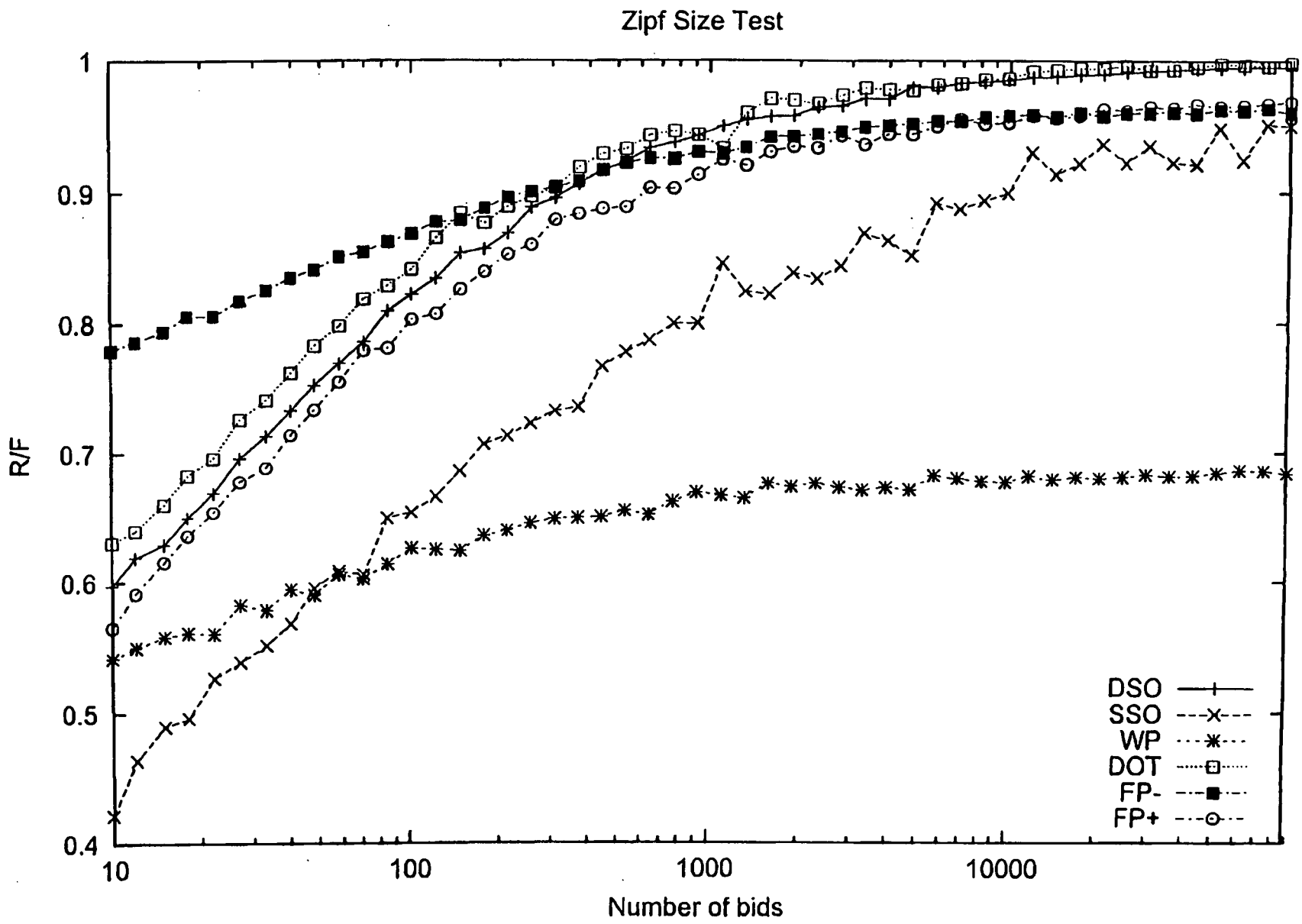
Zipf Size Test
R/F
Number of bids
1
0.9
0.8
0.7
0.6
0.5
0.4
10
100
1000
10000
DSO
SSO
WP
DOT
FP-
FP+

FIG. 9

DOT260"6EE9960

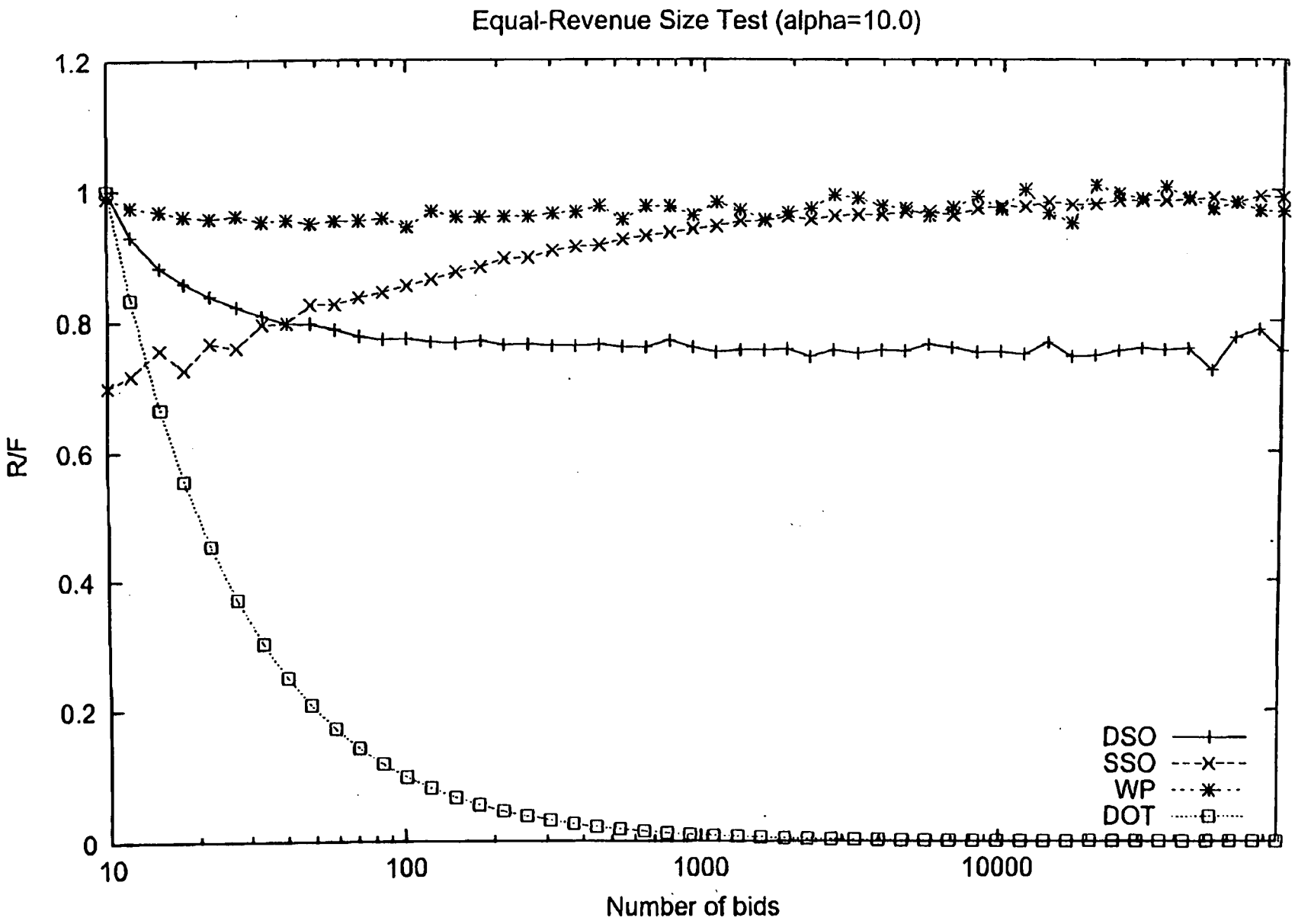

Fig. 10

00T260' 6E99960

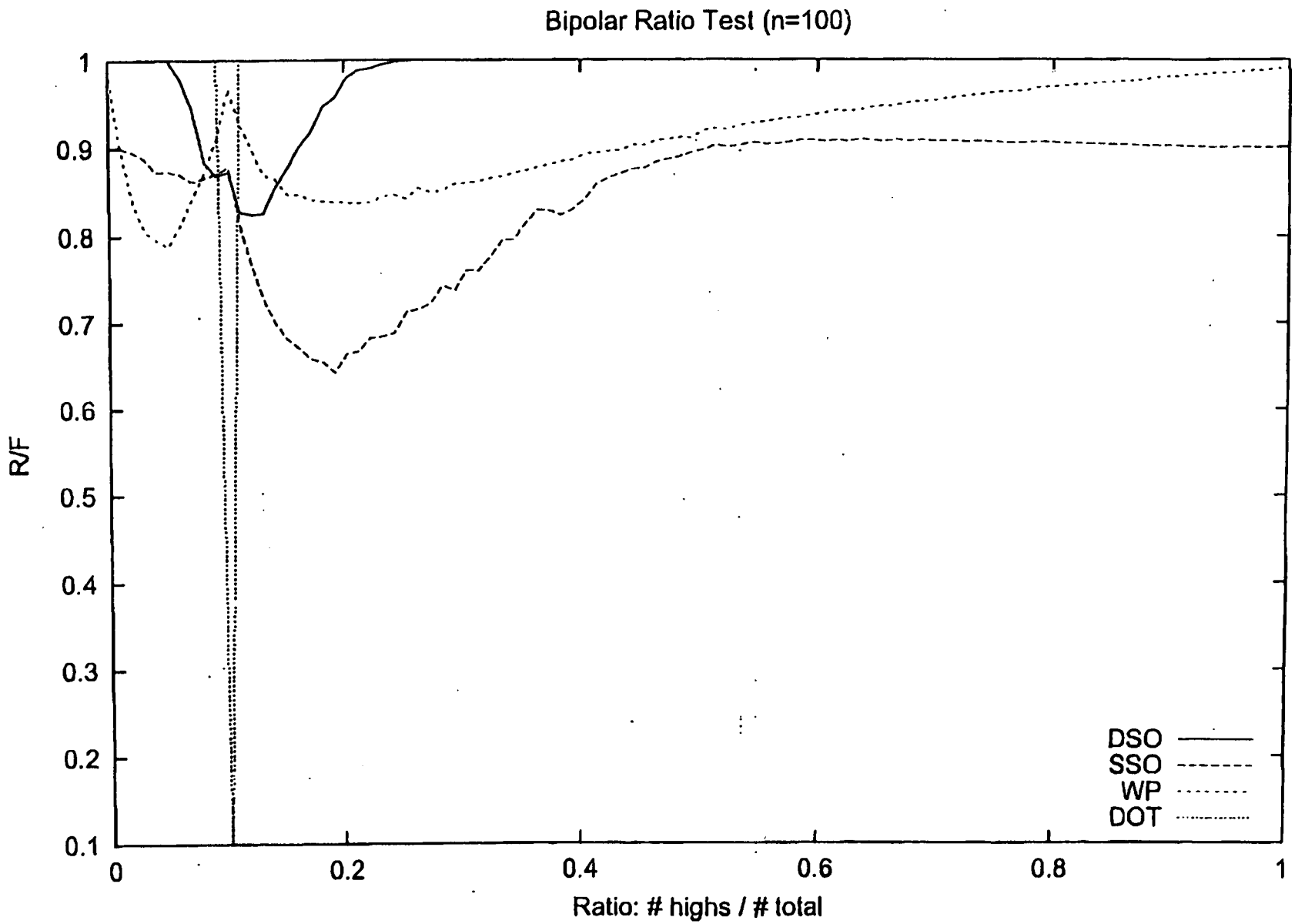

FIG. 11